Gunfit.

Mirror, Mirror, on the wall, does my shotgun fit…… at all?

Fitting Fact. It's a waste of time fitting a shotgun to a new shooter until he has acquired some "shotgun technique."
Fitting Fact. If you can't shoot before the gun fit, (ie. if you don't know how much lead the target needs,) you won't shoot any better after it.
Fitting Fact. Many "Standard" size guys don't need a gun fit.
Fitting Fact. Most times the problem is a poor gun mount, not gun fit.

These days, with modern technology and the internet, we can see many suggestions on Youtube demonstrating the correct way to pattern a shotgun to check that it fits. One of the most popular clips is the one where the guy demonstrating is bench-resting the shotgun, exactly like you would do with a rifle. Unfortunately, although this will prove the point of impact prints on the plate, it proves absolutely nothing in terms of gun fit for the individual as he uses the gun. Why? Because by doing it this way, the result is a perfect pattern every time. *Anybody* can pick up *any* shotgun and by wriggling their head about to position the eye correctly relative to the bead, shoot perfect patterns with the gun. Some coaches will tell you that as you mount the gun, you should check to see if you see the "figure of eight alignment" as you do this. Then later, these same coaches tell you to remove the bead on the end of your gun to "stop you looking at it." It's a strange perception. Just for the record, one of the best shots in the World, Richard Faulds, doesn't have a bead on the end of his gun. I wonder why?

One of my first shotguns was an ancient Thomas Bland side by side that I bought cheaply, probably at least a hundred years ago. Well, it seems that way to me at any rate. In those far off days I didn't shoot clay pigeons, but times were tough and food was scarce. Everything I shot was either sold, or eventually ended up on my mother's dining table. My big sister was always complaining as an unfortunate chomp down on a stray lead pellet that my mother had missed as she prepared my bounty left her with a nasty surprise and a pained look on her face. Like most side by sides, the gun had a lot of drop and the stock pounded my young face mercilessly. I learned quickly that those heavy Czechoslovakian duck loads nearly dislocated my young shoulders, gave me with spots before my eyes and left me wondering what planet I was on. Ah yes, those were the days! Chipped teeth and multiple bruises, who could ask for more?

But I was lucky. A mentor showed me the correct way to mount the gun.

"Practice throwing the gun up lad until you can do it blindfold and your arms are numb. Then practice some more…….! And I did. I practiced my mount until I could do it blindfold. Literally. Of course, I'm exaggerating……aren't I? Nope, I'm afraid not. The gun mounting techniques that I was shown then, as all my clients have found out, work just as well today.

Later, I owned a gun store in Scotland for many years and I fitted lots of shotguns. I learned a lot by experience; in those days, there were no books that were written purely on the subject of gun fitting until my friend and fellow Brit. Mike Yardley came out with "Gunfitting, the Quest for Perfection." It's a good book. I took my British Field Sports Society instructor qualification with Mike many years ago. Today, I believe there are books written by others on the subject of gun fitting but I confess, I have not read them. In this section I will tell you what I consider to be good, solid advice on gun fitting. It's worth reading all of it.

We often hear it said, we *aim* a rifle, but we *point* a shotgun. Very true. Successful use of a rifle depends on a rock steady aim as we line our eye up with the rear and front sight on the gun with a *stationary* object. With a shotgun, however, we are attempting to intercept something that is moving. We simply cannot focus on the end of the gun and the target at the same time; the human eyes are incapable of doing this. This is why good gun fit is essential. As the gun is mounted to the shoulder, the master eye must be in perfect alignment with the rib, *without* checking this by looking at the gun. In other words, the shooters eye becomes the back sight. A glance at the gun, however fleeting, spells disaster for the successful competitor or bird-hunter.

A pre-mounted gun may work well in some situations. Trap shooters pre-mount their guns in this way and also most American skeet shooters. The reason they can get away with doing this is because the targets are always predictable and (with trap especially) there is very little gun movement involved. Because of the minimal lead requirement, it is possible to rifle shoot trap targets and shoot a good score. It's the wrong way, but some trap shooters do just that. But for the mandatory low gun position of ISU skeet and FITASC and for some of the

less predictable Sporting Clay presentations and any bird hunting situation, a perfect mount is essential. Predictably unpredictable, we never know where they are coming from or going to. For any degree of success, with these targets, our gun mount must be unerringly accurate, every time.

Sometimes, I don't say what the others say. Like the guys that suggest that you should practice your gun mounting technique in front of a mirror. Does it work? Not for some of us, but don't take your word for it…….. try it yourself. As you mount the gun in front of a mirror and look at the reflection, didn't you look at the bead? Didn't you wriggle your head about and cheat, to consciously line the beads up looking for that old "figure of eight" stuff that everyone tells you? Of course you did.

Unfortunately, that's exactly what you can end up doing as you use the gun in actual shooting situations and this "mirror" practice can encourage a split second glance at the gun to check alignment, so beware! Sometimes, this encourages *consciously* lining your eye up with the bead, which may be a bad habit to break when out in the field. In other words, as each mount is completed, the shooter will quickly check that his eye is in alignment with the rib. Do this for a split second as you trigger a shot at live quarry in the field and the gun will stop. *Tactile* assurance that the gun is in the correct place is what we are looking for not *visual* assurance by glancing at the rib to check alignment. So at the end of this article, I will tell you the best way to practice your gun mount……but no cheating and leaving the middle bit of this article out, there's a lot of good stuff in here for you to read.

Next time you visit your local gun-shop, watch what happens when a perspective buyer selects a gun from the rack. My guess is that he will shoulder the gun a few times, then each time he does this, wriggle his head about so that his eye is more or less lined up with the bead.

"Ah yes," proclaims the observant shop assistant (who is more than likely on a healthy commission for selling him the gun in the first place) "That seems to be a good fit for you." Then he then adds with a knowing wink; "Yes, Sir. You'll put plenty of birds in the bag with *that* gun." Unfortunately, both the shop assistant and potential buyer have got it wrong.

If the potential buyer has been shooting for a few years and he has acquired some "shotgun technique" during this time, he may abandon the gun in favor of another from the rack that just "feels" better dynamically and mounts more correctly to his master eye. But even then, if the gun that he selects has nice engraving, or the stock has a nice piece of "sexy" looking well figured walnut, there is still a slim chance that the buyer will abandon objectivity. He will often slacken his purse strings and part with his cash for a gun that doesn't really fit, in favor of one that, instead, is sure to impress his shooting buddies.

This scenario is very common with the husband that selects a gun for his wife. Big game hunting safaris are fashionable not just here in the Dallas area but right across the US. Perhaps the husband and wife have enjoyed hunting plains game together with rifles on these safaris. Now, the husband has decided that the lady of the partnership, for the first time in her life, would like to learn to shoot winged game with a shotgun. The conversation in the gun-shop might go something like this:-

"My wife and I are going on a dove hunting trip to Argentina next month and she needs a shotgun. I would also like her to use it for doves and quail. What would you suggest?"

The eyes of the gun-shop assistant begin revolving like the numerals on a one-armed bandit in a Vegas casino.

"Ah, yes sir we have just what you are looking for," he replies, as he steers the happy couple towards the most expensive gun cabinet in the store. Selecting a nice 20 g. side by side from the dazzling array in the top shelf cabinet, he opens the gun and passes it to the husband. The elegant carved fences and gold inlay on the action are an instant attraction for the lady. The glowing, amber tones of the well figured French walnut, graceful curves and the sweeping lines of the straight English stock add to the attraction. The husband passes the gun to his wife and she attempts to mount it a few times.

"It feels so *light*" the lady squeals delightedly "so much better than those heavy guns of *yours*, darling!"

The salesman smiles to himself in smug secrecy; he knows his stuff. He's seen it all before and he knows the gun is as good as sold. A few more guns are picked from the shelf, equally nice guns, but (in the ladies eyes) none seem to compare with the first one.

"We'll take it" the husband says, his wife squeals with more delight and the shop assistant pitches in with the next phase.

"Of course Sir," he says, "now we will need to make sure that the gun is a good fit for your wife."

That said, he proceeds to show the lady how to mount the gun. Each time he does this, he stands in front and peers down the muzzles at the ladies eye to make sure the gun is in the right place. Then he gently moves the ladies head up and down or left and right to compensate if it isn't. In other words, he tries to get the lady to mould *herself* to the gun, not the other way around. He also makes impressive looking notes on a fitting form of any alterations that must be made to the stock, to make the gun fit. Don't forget that at this stage, the lady has never, ever, handled, let alone fired, a shotgun. Unfortunately (and there is no easy way for me to say this,) fitting a shotgun to a new shooter in this way is a complete waste of time. In a month or two, when the lady has become proficient at mounting the gun and familiarized herself with the

handling dynamics, she will need to return the gun to the store and have the stock re-bent……..unfortunately at the cost of another $1,000.

Innumerable times over the last twenty years or so I have had clients come to me and ask me to teach their wives to shoot. Sometimes, the gun they bring for their lady to use is a wise choice; it's a reasonable fit and it has some weight to it, to keep recoil to a minimum. Other times, the gun is not a good choice and I politely refuse. This, unfortunately, often upsets the husband who may have parted with a small fortune for the gun. So why would I refuse?

Because, after three or four shots, the gun will be whacking the lady so hard in the face and shoulder that she is ready to abandon any attempt at shot gunning and take up golf or tennis instead. And there is another reason. Months later, the same lady is at a sporting clay charity shoot. She hates using the gun with a passion now and couldn't care less if she hits anything or not with it…… and it doesn't go unnoticed.

One of the onlookers at the event nudges his companions. "You see that lady over there? She couldn't hit a cow in the arse with a banjo!" then adds; "Didn't Pete Blakeley teach her to shoot?" So my credibility is on the line.

Several years ago, after being faced with this situation on numerous occasions, I visited one to the gun shops in the Dallas area. I politely asked one of the salesmen which shoulder he shot from and he confirmed that this was his right shoulder. I then asked him to select a gun from the rack and asked him if he would oblige me by mounting the gun instead in his *left* shoulder. The sales assistant looked at me quizzically, but then did as I asked and mounted the gun. It was immediately obvious that this was very difficult for him to do. Try as he might, the gun just did not go where he intended it to. His head contorted all over the place and he was wriggling for all he was worth to get the gun somewhere near the right place.

"It feels awkward to do this" he eventually admitted. Really? Now there's a surprise.

"That," I commented to the assistant, "is exactly how a new shooter feels when they try to mount a shotgun for the first time." In other words, how can you fit a shotgun to a new shooter if he can't get the gun in the same place twice? The answer is you can't.

I must have made an impression, because new clients started appearing with stocks with more or less standard dimensions and any alterations were made after the mounting technique improved, not before. Anyone can pick up *any* shotgun and make it conform to their personal physical dimensions by mounting it and then wriggling their head around. But, unfortunately, that does not mean that the gun is a good fit for them. In other words, the gun must be made to fit the user, not the other way around. New shooters don't understand this and try to use a shotgun like they would a rifle.

Miss-alignment by as little as a ¼ inch at the shotgun end will translate into a miss of several feet at the target end. We can think of it this way. Let's say that, as the gun is shouldered, the master eye is elevated above the rib by as much as ¼ of an inch. If we project a line down the rib of the gun out to the target to about 20 yards and another line out to the target from the pupil of the shooters eye, that ¼ inch miss-alignment at the gun end, will translate into miss over the top by several feet at the target end.

One of the main reasons for missing on live birds is head lifting and this is even more so on descending birds. The reason is simple. If the shotgun comes to the shoulder too early and the bird is coming down, a duck dropping into the decoys or a dove dropping into a tank in the evening, for example, the gun may move to intercept the bird but your face will stay where it is. In other words, your hands move the gun in a downward direction to intercept the bird and this pulls the gun away from your face. Keeping the gun out of your shoulder until the shot is triggered will reduce the tendency for this to happen. It's all down to good gun mounting technique. If the mount is good, the gun will shoot where its user looks.

As an even worst example of poor gun mounting causing problems in the field, hands up all the guys that return from a dove/duck or pheasant hunting trip with a large, impressive looking bruise on their upper arm? Most of us have been there at some time or other haven't we? The sudden appearance of the fast flushing bird triggers a physical response and we throw the gun up in a desperate attempt to "get on him." Unfortunately, often the butt of the gunstock ends up nowhere near where it should be, but we trigger the shot anyway. The bruise on the arm means that instead of the gun being where it is supposed to be, it is instead about four to six inches off! Project two lines out to the target *now* and the inevitable miss maybe by several feet!

Quail hunters are notorious for bringing the butt of the gun into the shoulder first, allowing the gun to pivot around the front hand as they do this. The problem is, as the butt comes up into the shoulder, the muzzles dip down……. exactly the opposite of what the birds are doing. On occasion, I have witnessed these guys, during a gun fitting session on the pattern plate, miss the plate entirely because at the point of pulling the trigger, the muzzles dip.

I have a suggestion here for the upland bird hunter that will help to perfect your gun mount that works very well. Suspend a string from a doorframe or a beam in the garage as in the picture below. Tie a loop in the string so that the muzzles of your gun will slip into it at about 6 inches below eye level and then practice your mount again.

You will find that as the muzzles of the gun push forward to complete the mount, the muzzles will remain parallel with the ground and not dip down each time. Twenty or thirty mounts like this for a day or two will improve will improve your consistency no end. Practice your gun mount until it becomes spontaneous, without the need for conscious thought. Each time you lift the gun say to yourself just as you complete the mount, "*INTO* the gun!" With both arms working as a team, the gun will come smoothly onto the line of the bird. This will eventually make your mount subconscious and, most importantly, you will stay in the gun as the shot is triggered.

Websters dictionary give the definition of spontaneity as:- <Acting or arising naturally and without constraint from an inner impulse, not planned or contrived> . Exactly! This is what we must do as the sudden appearance of the bird triggers a visual response. If the mount isn't spontaneous and we can see the bird for any length of time, many of us execute a gun mount that borders on time-consuming paralysis, culminating in a final head wiggle …just to make sure we are looking down the rib. If this sounds like you, there is work to do! Don't forget, on some birds (quail and most fast flushing birds for example) there is very little time to waste.

When I first came over here from the UK in 1997, gun fitters were as scarce as rocking horse droppings. Now, they are springing up all over the place, like flowers in a roadside ditch. Some are good, some are not so good. But make no mistake, there is money to be made in the gun-fitting industry!

All shotgun manufacturers have a set of standard stock dimensions that they apply to all "of the shelf" guns. These dimensions are *approximately* 14 ½ inches length of pull, *approximately* 1 ½ inches drop at nose and *approximately* 2 ¼ inches drop at heel. There will most likely be a small amount of cast, ¼ inch at heel and slightly more at toe. The manufacturers know that these measurements will be "acceptable" for Mr. Average. If the user is somewhere between the parameters of 5' 6" and 6' 2" and 170 lbs to 200lbs the "off the shelf" gun *providing the user learns to mount it correctly*, may be a good fit for him and point where he looks.

Sometimes, I get a "standard sized" client and during a lesson, he will reveal that has had paid handsomely to get his gun fitted. When I measure the gun, the drop gauge reveals that the gun is exactly same dimensions as it was when it came out of the box from the manufacturer. But the client paid for it to be fitted. I wonder why?

Most competitive shot-gunners eventually opt for an adjustable comb and an adjustable butt plate on their gun. Now they can "tweak" the gun to their hearts content. Some of these guys become paranoid about the fit of their gun and after a bad day on the sporting clay course or skeet field, out come the Allen wrenches and they bang away for an hour or two on the pattern plate, convinced that their poor score is a gun fit problem. It may well be, but most times it can be an inconsistent mount or just plain ol'pilot error. In other words, they don't know how to shoot.

Luckily, most bird hunters don't go to this extreme. But the point I'm making here is this. It is unfashionable to have an adjustable comb or butt pad on a bird hunting gun, it just doesn't look right does it? So perhaps, before you order that very expensive bespoke pheasant, dove or quail gun it would be best to "rough out " the measurements with a more regular and inexpensive gun. Then, after using it for a season, the measurements can then by transferred to the custom gunstock and they have a good chance of being more or less correct. Because if they're not, the bird hunter that painstakingly and lovingly selects that piece of Turkish walnut may have had it carved to the wrong dimensions. If that's the case, all he has now is an expensive piece of firewood.

I fit lots of guns and often, when clients visit me for the fittings, they bring several guns, all with different dimensions. Immediately, this is a problem. Providing the clients gun mounting technique is good, we can then go to the pattern plate to find out where the point of impact is for each gun. If the points of impact are different in each case, the guns need to be altered accordingly, because they should all be the same. Please let me explain what I mean by that. Over time, when we become competent shots, we build up a repertoire of bird/barrel relationships or sight pictures that we know to be correct. By using different guns that shoot to different points of impact some of these bird/barrel relationships will not work for us and we end up missing birds for no apparent reason.

If, as an example, the first gun that the client shoots on the pattern board shoots with a perfect vertical alignment but the pattern is 100% high. This indicates that the place where the shooters face touches the stock is too high. He may have a degree of success and hit flushing, rising birds with the gun. If the next gun he patterns shoots with a 60%-40% pattern, with this gun, he will shoot underneath those same birds.

There are four dimensions we must consider when we fit a gun. These are length, drop, cast and pitch. Length is also known as length of pull. It is measured from the center of the trigger (front trigger on a double gun) to the center of the butt plate. Most American guns come with a standard length of pull of about 14 ¼ to 14 ½ inches. European guns are routinely slightly longer than this, I have no idea why. A good gun fitter will measure length of pull from the trigger to the heel, center and toe of the stock. Length of pull must be measured in three places.

The reason for this is to get the pitch adjustment right to fit the shooters shoulder. More about this in the section on pitch.

The widely believed method of holding the gun at the grip with the trigger finger in position and seeing if the butt makes contact with the biceps is *not* a conclusive way to determine stock length. The procedure is an "old wives tale" and unfortunately proves nothing. By the same rule, most shooting coaches will tell you that, when the gun is mounted, there should be of approximately two to three finger widths between the back of the hand and the front of the shooters nose. This will depend on the position of the shooters head on the stock. With the side by side shotgun with a double trigger, length of pull should be measured from the front trigger. The picture on the left shows my adjustable gun that I use to determine the correct stock measurements. It will adjust for length, cast, drop and pitch. The measurements are then taken with the drop gauge.

With a new shooter, head placement will vary a lot until they learn to mount the gun correctly; this in turn may give the impression that the gun is too long *initially*. The stock should be as long as the user can comfortably mount and swing, so in the early stages of a new shooter using a shotgun, don't be tempted to hack a lump of the end of the stock. As the user acquires some technique, the gun will be mounted differently.

Thickness of clothing must also be considered. A longer stock definitely does point and control recoil better, but if it is too long, it will catch on the clothing and it will be slow to mount. In other words, the 20 gauge with the 14 inch length of pull that is used for dove in South Texas may be fine when the user is wearing a thin shirt. This gun shown in the picture on the left is far too short. As the gun recoils, the shooters back hand will drive into his nose. But if the same gun is used in freezing conditions in the UK for driven partridge when the shooter now wears several layers of insulation, this will now increase the length of the stock to such an extent that as the gun is mounted, his eye will drop behind the receiver. The easiest way to remedy this is to fit a spacer between the stock and the butt pad for

dove season and remove it for the additional clothing of cold weather. A stock which is too short, will result in bruising to the nose and front face as the gun recoils. Also, in the final stage of the gun mount, muzzles of the short stocked gun may dip slightly. A happy medium, somewhere in between the long and the short is what we are looking for.

As far as accuracy is concerned, drop is arguably the most important measurement. If a straight edge is placed along the top of the barrels, the measurement from the bottom edge of this to the top of the comb is known as the drop. There is a big variation, on a standard field stock, between the measurement at nose which is the front of the comb, and at heel which is the back of the comb. Most field stocks have a standard drop at nose of 1 ½ inches and 2 ¼ inches drop at heel. This makes the angle of the comb in relation to where the cheek touches it quite steep.

Because of this relatively steep angle a gun with a stock of these dimensions the placement of the eye above the rib will vary accordingly. Although the gun may be perfectly acceptable to a shooter of average proportions it will shoot high for someone who needs a short length of pull, and low for someone needing a long length of pull. Any alteration to comb height will influence the position of the shooters eye above the rib. The gun will shoot high, if the shooters eye is too high. The shots will be low, if his eye is too low. If the shooters eye is so low that it is hidden behind the breech, this will persuade the wrong eye to take over as the gun is brought to point of aim.

With a properly fitted gun, the butt pad as a whole should fit comfortably into the shoulder, with the heel level with or just below the top of the shooters shoulder. If it isn't, as the gun recoils 100% of the recoil will be transferred to 50% of the shoulder pocket. A point worth mentioning here is that many shooters with long necks and sloping shoulders who favor side by side shotguns *always* feel some discomfort as the guns recoil, especially with light guns and heavy shells. This is because they may need such a large amount of drop, the resulting increased angle to the top of the comb will push the gun rearwards into the shooters cheekbone. Where bruising to the bottom of the cheekbone is a problem, a combination of this and a pitch problem is usually the reason why.

The place where the face actually comes into contact should be marked when the stock is measured. I fit lots of guns to lots of clients and during the fitting session, I stick a white paper label onto the top of the comb of the try gun as shown in the picture below.

In the center of this label, I make a mark and then a corresponding one on the clients face. Sometimes, as the client mounts the gun there will be a variation of up to 2 inches between each mount. In other words, the client may "creep the stock" on the first mount and be in front of the mark, level with the mark on the second and behind the mount on the third mount. If we measure these differences with a drop gauge as in the picture below, the variable position of the clients eye will give a variable horizontal reading on the pattern plate. The skilled gun fitter should be able to "guestimate" which measurement he needs for the correct fit. Many competition shooters favor a Monte Carlo comb that is parallel to the line of the top rib.

This means that regardless of the length of pull, the eye remains in the correct position. Most competition guns now have the luxury of an adjustable comb and this makes a lot of sense; as our bodies change, our stock prescription changes with it. Weight loss or gain, flexibility change due to age or injury can all affect the way we bring the gun to point of aim. Many ladies also will benefit from a parallel comb simply because ladies routinely have longer necks than men do. Long necked ladies have a habit of dropping their face forward onto the stock as they complete the gun mount and the parallel comb can compensate for this. The answer can be a parallel comb but on a game gun? They just don't look right do they?

Cast is the amount of deviation of the butt requires laterally from the line extended along the rib of the gun to give proper eye placement above the rib. Cast is measured at "heel" and also at toe. When the shooter is a large chested man with pronounced pectoral muscles, or a well endowed lady, a stock with a pronounced toe, for these people, will do two things; dig in to the flesh of the shoulder pocket in the wrong area and cant the gun over at an angle as the gun recoils. The shot will be off to the side, if this happens and there will be give poor recovery for a second shot. A stock which is angled to the right is known as "cast-off", angled to the left is known as "cast-on". As a general rule, broad shouldered people will require more cast than slightly built people. Any alteration to the cast of a gun will move the center of gravity and

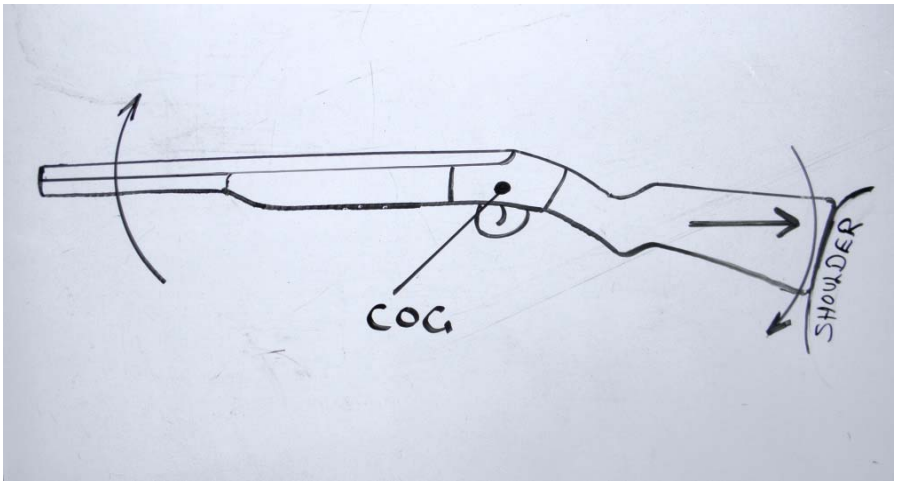
depending on the gun type, the gun may then "side flip" as a result. Finely built sides by sides with a small grip radius were extremely susceptible to this and would noticeably pull to one side, especially if the choke barrel was fired. Years ago eye dominance problems were sometimes rectified by means of a "cross over" stock which greatly increased this "side flip" effect further; I had two clients who shot with these guns when I lived in the UK and believe me I found them extremely difficult to shoot because of this side flexing. I am sure that with regular use, the user would subconsciously control this side flip, depending on which way the gun was swinging at the time the trigger was pulled. A gun should be brought smoothly to the face with the head erect, not canted over. This sideways cant is often to make up for lack of cast and often the reason why we experience bruising to the side of the face.

Pitch is basically the way in which the gun fits the shooters shoulder and the angle of the butt of the gun relative to the axis of the bore. In my opinion, this is the most misunderstood measurement and it is responsible for more recoil problems with bruising to the face than any other stock dimension. Most guns have some down pitch and it is easy to measure this by placing the butt of the gun squarely on the floor next to a wall as in the picture on the left, then sliding the gun towards the wall until the receiver touches it. The measurement between the muzzles and the wall is the pitch measurement. The greater the measurement of the distance the

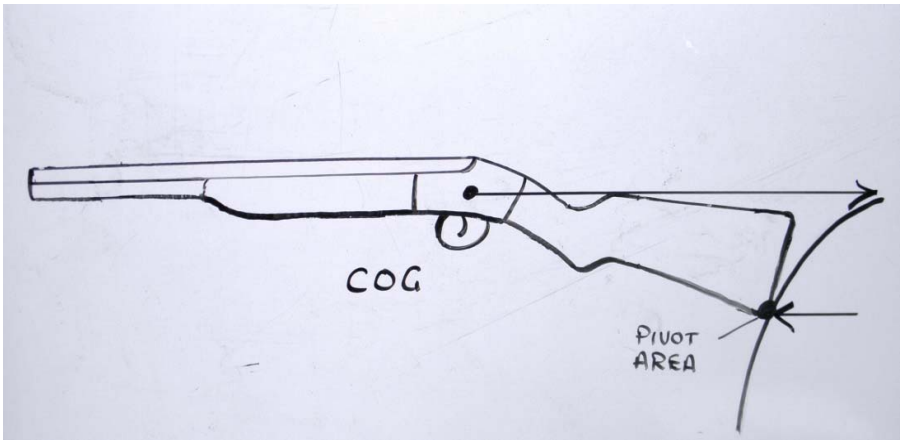
muzzles are away from the wall, the greater the down pitch. Small pitch adjustments can dramatically influence the way recoil is transmitted to the shoulder. Too much down pitch and the butt will slide up during recoil and a whack under the cheekbone is the result. Too little and the gun will slide down producing excessive "muzzle flip" and the gun will shoot high. Pitch and cast adjustments must complement each other. Just as with cast adjustment, a shooter with large pectoral muscles (or well endowed lady) will benefit from careful consideration to pitch adjustment. Failure to do this will mean that the butt plate is in contact with only a small area of the shoulder pocket, and when this happens recoil is transferred to part of the pocket instead of the whole, more about this later. If this main area of contact is the toe of the butt plate once again, this can have painful consequences for the shooter.

If the shooters shoulders are fairly narrow but he has large pectoral muscles, a recoil pad that is fixed at an angle will be an advantage. This means that the heel of the pad would be in the shoulder pocket, and the toe slightly further out towards the armpit. This is a much more comfortable solution for many people (especially those ladies which we mentioned!).

There can be three reasons why your shotgun whacks you under the cheekbone as it recoils. Poor gun mounting, too much drop at face and the third one, pitch. Too much drop means that as the gun recoils, the angle of the comb drives the gun rearward and into the shooters face. That's why Browning put the "hogs back" stock on the Cynergy. The pitch problem is more complex and pitch is one of those measurements that is not fully understood by many.

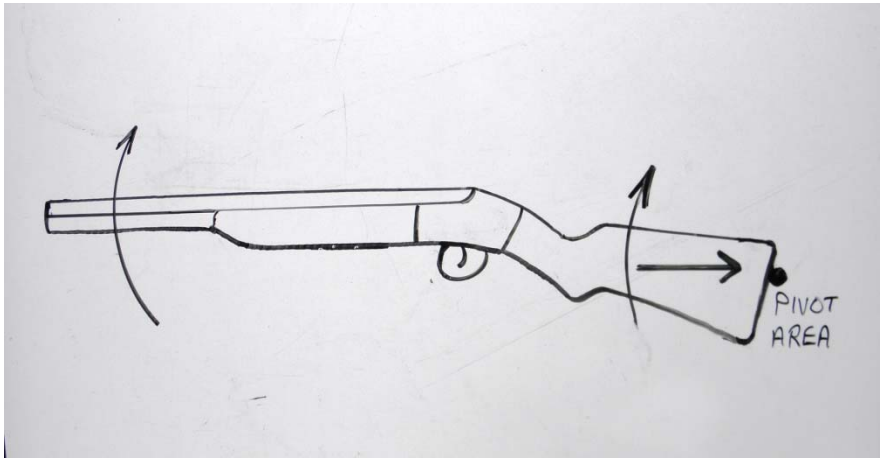


The way a shotgun recoils can be divided into two periods. The center of gravity of a shotgun is not along the axis of the bores but underneath the axis of the bores as shown in this diagram on the left. If the center of gravity was along the axis of the bores, the gun would recoil in a rearward direction only. Because the center of gravity is underneath the barrels, as the gun is fired, the barrels push rearward but also pivot around this center of gravity.



In the first phase of recoil, the gun travels to the rear and then encounters the firm resistance of the shooters shoulder, then, during the second phase of recoil, the gun rotates upward using the shooters shoulder as a pivot as shown in this picture.

As the gun pushes into the shoulder, the head pivots forward and down at the same time that the comb of the gun is rising up towards the shooters face. In mechanics terms, this is called a "couple".



The two most important things the shooter must consider are first and foremost, the force that the gun pushes rearward during this recoil and second, the amount the comb of the gun pushes upward into the shooters face. This is directly proportional to the

weight of the gun and the shot load that is put through it. In this second phase of recoil the area where the gun pivots on the shoulder depends on where the butt touches the shoulder. If the pitch on the gun is correct and most of the butt is in contact with the shoulder, all will be well. However, if the guy firing the gun has large, sloping pectoral muscles as shown in the picture shown below and the toe of the butt pushes into his shoulder first, the greater the distance will be from a line through the center of gravity and the point where the gun touches the shoulder first. If that's the case, the gun will rotate upward and push into the shooters cheek.

The greater the distance between the rearward travel through the center of gravity and this pivot are, the more likely the gun is to push up into the cheek.

If you are experiencing discomfort like this, you can try this simple way to prove it. Partially unscrew the two screws that hold the butt pad on the stock of the gun. Slide either a washer (a quarter will do) under the heel of the gun and re-tighten the screws. Doing this will increase the down pitch so that eventually, the entire surface of the butt fits snugly into the shoulder pocket. The pitch can then be measured from the trigger at heel, center and toe and a permanent fix can be carried out by a competent gunsmith by installing a pitch spacer.

Something else which we must consider (but most shooters don't) is the fore end of the gun. The front hand does the pointing, so it seems logical that if the shape if the fore end can influence the way the gun assists this pointing attitude in the hands of its user, so much the better. Fore ends come in many different styles, from the elegant "splinter" found on the traditional side-by-side to the "beaver tail" which is also usually found on a side by side. The splinter is found on all traditional "English" side-by-sides and with this type of gun it is designed to be held in conjunction with the barrels. The disadvantage is that in situations where multiple shots are fired, the barrels quickly become too hot to hold, a serious problem on the productive driven pheasant shoot! The answer is the leather hand guard of course but I have often seen some blistered fingers and heard some choice obscenities when for some reason this essential piece of equipment was omitted! The only gun I saw a beaver tail on in the UK was the Winchester Model 23 and the AYA No. 3. Over and unders routinely have a bulkier fore-end. The semi-beaver tail and Schnabel or "Tulip" are found on many over & unders. The hunting or standard is slightly slimmer, without the "beak" of the Schnabel. The semi beaver tail is found on many skeet and trap guns, and the full over and under beaver is in my opinion a real "handful" and I have only ever seen it on two guns, both of which were made for the American market.

A correctly fitted shotgun inspires confidence, and in use, the shooter will experience subconscious, tactile assurance that tells him his head is in the right position as he triggers each shot. Let me put it this way. If, as you get dressed in the morning, you put your shoes on the wrong feet, you would realize there was a problem with the first steps you take. A perfectly

fitted gun is the same, it just "feels right" somehow. In a nutshell, you can peer down the barrel in front of the mirror as much as you like, but this still doesn't tell you where the gun shoots does it? All the top shots, both wing and clay, rely on what I call subconscious tactile assurance, *not* visual assurance that tells them their heads in the right place and there's no easy way to do this. The final evaluation of the gun in the hands of its owner is an individual thing and can only be positively identified on a pattern board. But I can't emphasize enough that to achieve the proper gun fit, you must have the perfect gun mount. *If you are positive* that your gun mount is as near perfect as you can get, try some shots at the pattern plate. A session on a pattern plate with an *experienced* gun fitter will expose a multitude of sins.

If, however, after five or six shots, an area shows on the plate, where the bulk of the shot is concentrated, now you can make adjustment to your stock to center the pattern. For every inch that the pattern is "off" target, the stock will need to be adjusted by a 1/16 th of an inch. If the main shot concentration is 4 inches high and 4 inches left, for example, the stock needs to be given ¼ inch more cast and ¼ inch needs to be removed from the comb height. Just like a tailor fitting a new suit, several visits to this stocker may be required until the stock is a perfect fit for the user. Why? Because one of the measurements even the best gunfitter in the world can't get right first time is the cast measurement because this is in turn affected by the thickness of the stock which varies with different manufacturers.

The wood of the gunstock can be bent by applying heat and there are several ways to do this. Years ago the usual method was to pour hot linseed oil over the wrist of the stock until it became pliable. Modern alternatives to this can be infrared lamps or heat from a hair dryer. There are other ways. Most stock alterations are best left to the expert. Elegant side by sides especially, require an expert gunfitter. The reason? Some of the older side by sides may have been repaired at the wrist and these repairs may not be apparent to the layman. Usually, the experienced stocker will thoroughly examine the area of the stock where the bend is to be made. If the stock has been repaired at some time, the application of heat will soften the glue in this area and may destroy a quality gunstock. In the picture below, expert stocker Paul Hodgins from Utah puts the finishing touches to the measurements of a quality side by side by using a bending jig/setting table

Ideal shot distribution is 60% above the target 40% below unless a high shooting gun is favored. Many competitive trap shooters, for example favor a gun that shoots high because in the initial stages of flight the targets are always rising. This means that the competitor can maintain visual contact with the target and still see the rising bird as he triggers the shot. A gun that is to be used for shooting flushing birds can also be required to shoot high for the same reason. But beware! For bird hunting purposes, ALL your shotguns should shoot to the same point of aim. In the heat of the moment it will be hopeless to try to consciously calculate this depending on which gun you are using at the time. For example, a high shooting gun may be perfect for putting a few extra rising quail in your bag but hopelessly inadequate for doves dropping into the tank in the evening for a sundowner because you will shoot over the top of them.

So what is the best way to perfect your gun mount? The gun should be lifted into the shoulder pocket by using *both arms in unison*. Push the gun forward *slightly* with a "bayoneting" action and lift the gun smoothly to the face and into the shoulder pocket with both arms. Don't raise the back hand first, allowing the gun to pivot around the front hand. This is known as "chopping down" on the target. Many quail hunters mount the gun like this. After a day or two mounting the shotgun like this, you will begin to develop some muscle memory…….but we haven't finished yet. Most times, as you complete the mount,

you will still consciously align your eye with the rib/bead. Everybody does, especially newbies. So now we must take the mounting process a step further to make sure you are relying on *tactile* assurance, not *visual* assurance to get the gun in the right place.

Try this. Close both your eyes and touch the side of your face lightly with your finger. Every time you do this, even if the touch is in a minutely different place, you will feel it. Now, do the same with your shotgun. Mount your shotgun ten times with *both eyes closed*. On the tenth mount, open your eyes. Where was your master eye relative to the rib? Was it high, low, left or right? Let's say it was high. Do the same again. This time on the tenth mount, where was your eye? Perhaps it is left this time. Perhaps the next time, it's to the right. So, your gun mounting technique is bringing the gun to a different place every time. So, what does that prove? Just that you still have work to do. Keep mounting your gun as above. Eventually, (and with a new shooter this may take several weeks) every time you open your eyes, the gun, because you have developed some *tactile muscle* memory, not a visual awareness of your master eye position, will be in the same place.

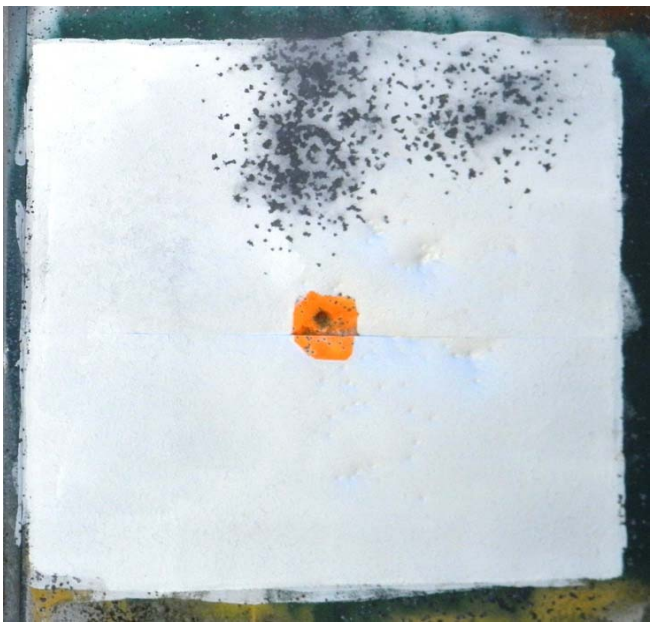
Now you can go to the pattern plate, because the gun is coming to the same place in your shoulder pocket every time. Of course at this stage that place may be high, low, left or right. It doesn't matter. A session on the pattern plate now will prove *conclusively* how the stock dimensions need to be altered. The final evaluation of the shotgun in the hands of its user is an individual thing. Regardless of his personal requirements, he should make it his business to find out *exactly* where his gun shoots and he must do this on a pattern board. A few shots at the pattern board can reveal a multitude of sins to the trained eye and if it's done right, pattern board evaluation will make a big difference.

The pattern plate is a thick steel plate about four feet square, the center of which is about four feet from the ground. There is a central mark, which is the target. The pattern plate can expose a multitude of problems but lots of gun fitters don't use one. Why? Because it's messy. They will tell you that a flashlight down the barrel, or peering down the muzzle from the front is just as good and does the same thing. It doesn't, because of the effect of recoil. Please read the section above on the effect of recoil again.

Years ago, whitewash was brushed onto the plate to indicate the pellet strikes. The problem with white-wash was that in cold weather it freezes, it washes off and it dries. I concocted my own formula for pattern plate whitener and now many shooting clubs throughout the US use it. For those that don't, here is the recipe again. It is a mixture of Titanium dioxide and Canola cooking oil. Titanium dioxide is white paint pigment and you can but a small tin very cheaply, about $7.00 at either Lowes or Home Depot. Mix a few tablespoons with Canola oil and apply it to the plate with a roller. The ratio is about 5:1, 5 parts oil to 1 part titanium dioxide. The mixture never dries (like paint) never freezes and doesn't wash off. Over the years I've had

some surprises on a pattern plate. To give you examples of just a few, expensive guns with top barrels shooting to a different point of aim to the bottom barrel, non concentric chokes and also bent barrels.

The correct way to use a pattern plate is as follows. Stand about sixteen yards from the board and focus *only* on the target area in the center. In other words, do not look at the rib or the bead on the end of the gun. Mount and lower the gun twice, and on the third mount, on the completion of the mount as the gun comes into your face and shoulder, fire. No matter how tempting it may be to do this, do not, *under any circumstances,* aim the gun like a rifle. I know, I sound like a broken record but I cannot stress how important this is. Many of us, especially for some reason under the scrutiny of the trained eye of an experienced gunfitter, will attempt to cheat and consciously line their eye up with the bead. If, after a few shots the pattern placement is erratic, this is a gun mounting problem. Go back to practicing your gun mount before you pattern the shotgun again. Only then will your shotgun shoot where you look. The prints shown below will give some idea of how the stock needs to be adjusted.



Comb too high. Patterns like this can indicate several things. Not getting into the gun, weight on the back leg, or a mount where the gun "travel" is too far from the shoulder and as the butt comes into the shoulder, the front hand is still lifting the fore-end. In other words, the complete opposite of the "quail hunters mount". If we can assume a perfect, "parallel action" gun mount for this shooter, the comb height needs to be lowered considerably, according to these patterns, about ½ an inch. If the gun is a semi auto, in most cases this can be done with the plastic shims. If the gun is a side by side or an over/under there are several options. A competent gunsmith can re-fit the head of the stock to the action by making a series of light chisel cuts on the cheeks. The stock can be bent by heating with either hot oil or heat lamps.

Both these will increase the angle of the drop at face and this in turn may cause a difference in recoil at face. The third way is to shave wood from the front of the comb and taper this off to zero at the heel, reducing both the comb height and the angle of the comb relative to the axis of the bores. This will make the felt recoil less.

The pattern on the left shows that the comb height of the gun is more or less correct for the shooter, but the vertical alignment relative to the target area can prove several things. Most times it shows that more cast is needed but it can also be an indication that (right master eye, right shouldered shooter) that the eye dominance is inconclusive as the gun is brought to point of aim. This is why some side by side shooters will print a perfect pattern because of the broad sighting plane of the two horizontal barrels but shoot to the left when using an over and under because of the vertically stacked barrels. The pattern here can also be the result of the comb height being too low on the gun and the shooters eye (which is behind the receiver) taking over as the gun is brought to point of aim.

Right on the money! Some of us could be overly critical and say that this pattern is 70% -30% instead of 60% - 40% but I would imagine most shooters would be more than happy if their gun patterned like this. Providing this was achieved *without looking at the gun*, this gun will shoot where its user looks. It makes things a lot easier.